

What is claimed is:

1. A cooling device for cooling a heat-generating member, comprising:

5 a refrigerant container constructed by stacking a plurality of plates for defining a space where refrigerant is stored, the plurality of plates including a first plate to which the heat-generating member is attached, a second plate disposed opposite to the first plate and at least a third plate between the first plate and the second plates; and

10 a heat radiation core including

a plurality of tubes attached to the second plate of the refrigerant container substantially vertically to a surface of the second plate, to communicate with the space of the refrigerant container, and

15 a header tank constructed by stacking a plurality of plates, through which the tubes communicate with each other,

20 wherein the refrigerant container and heat radiation core are disposed in such a manner that, refrigerant is boiled by receiving heat from the heat-generating member attached to the first plate of the refrigerant container, and the boiled refrigerant flows into the tubes to radiate heat to outside in the heat radiation core.

25 2. The cooling device according to claim 1, wherein:
the plurality of tubes includes first tubes through which refrigerant mainly flows from the refrigerant container

into the header tank, and second tubes through which refrigerant mainly flows from the header tank into the refrigerant container;

5 the refrigerant container has therein a first barrier portion for restricting refrigerant from flowing into the second tubes; and

the header tank has therein a second barrier portion for restricting refrigerant from flowing into the first tubes.

10 3. The cooling device according to claim 1, wherein the header tank has a capacity smaller than a capacity of the refrigerant container.

15 4. The cooling device according to claim 1, wherein each plate constructing the refrigerant container has a surface area larger than that of each plate constructing the header tank.

20 5. The cooling device according to claim 1, wherein at least one of the plates constructing the refrigerant container has the same shape as at least one of the plates constructing the header tank.

25 6. The cooling device according to claim 1, wherein another heat-generating member is attached to the plate disposed at a most outside of the header tank.

7. The cooling device according to claim 6, wherein:
the plurality of tubes includes first tubes through
which gas refrigerant boiled in the refrigerant container
flows from the refrigerant container to the header tank, and
5 second tubes through which gas refrigerant boiled in the
header tank flows from the header tank to the refrigerant
container;

the refrigerant container has therein a first barrier
portion for restricting gas refrigerant from flowing into the
10 second tubes; and

the header tank has therein a second barrier portion
for restricting gas refrigerant from flowing into the first
tubes.

8. The cooling device according to claim 1, wherein
the tubes are disposed on the second plate of the refrigerant
container in zigzag.

9. The cooling device according to claim 1, wherein:
20 the plurality of tubes includes first tubes each
having an insertion length inserted into the header tank, and
second tubes each having an insertion length inserted into the
header tank, smaller than that of each first tube; and

each first tube protrudes from an inner surface of the
25 header tank inside the header tank by a predetermined length.

10. The cooling device according to claim 1, wherein:
the plurality of tubes includes first tubes each
having an insertion length inserted into the refrigerant
container, and second tubes each having an insertion length
5 inserted into the refrigerant container, larger than that of
each first tube; and

each second tube protrudes from an inner surface of
the refrigerant container inside the refrigerant container by
a predetermined length.

10 11. The cooling device according to claim 9, wherein:
each second tube has an insertion length inserted into
the refrigerant container, larger than that of each first tube
inserted into the refrigerant container; and

15 each second tube protrudes from an inner surface of
the refrigerant container inside the refrigerant container by
a predetermined length.

20 12. The cooling device according to claim 9, wherein:
the heat-generating member is attached onto the first
plate in an attachment area; and

25 the first tubes are disposed on the second plate
within an area corresponding to the attachment area, and the
second tubes are disposed on the second plate of the
refrigerant container outside the area corresponding to the
attachment area.

13. The cooling device according to claim 9, wherein the insertion length of each second tube inserted into the header tank is set to be substantially equal to a plate thickness of the plate of the header tank, into which each second tube is inserted.

14. The cooling device according to claim 11, wherein the insertion length of each first tube inserted into the refrigerant container is set to be substantially equal to a plate thickness of the second plate of the refrigerant container.

15. The cooling device according to claim 1, wherein one of each tube and the header tank includes a first insertion regulating member for regulating the insertion length of the tube inserted into the header tank.

16. The cooling device according to claim 15, wherein:

the first insertion regulating member is a step portion provided at an end of the tube;

the step portion has a surface substantially perpendicular to an insertion direction of the tube; and

the surface of the step portion contacts the header tank when the tube is connected to the header tank.

17. The cooling device according to claim 15,

wherein:

the first insertion regulating member is a step portion provided in the header tank around an insertion hole of the header tank, into which the tube is inserted to communicate with the header tank;

the step portion has a surface substantially perpendicular to the insertion direction of the tube; and

a top end of the tube contacts the surface of the step portion when the tube is inserted into the insertion hole.

18. The cooling device according to claim 1, wherein:
the header tank includes:

a first plate defining a plurality of first holes into which the tubes are inserted; and

a second plate with which the first plate is stacked, the second plate defining a plurality of second holes each having an open area smaller than an open area of each first hole; and

the tube is inserted into the first hole to contact the second plate around the second hole to communicate with the second hole.

19. The cooling device according to claim 1, wherein one of each tube and the refrigerant container includes a second insertion regulating member for regulating the insertion length of the tube inserted into the refrigerant container.

20. The cooling device according to claim 19,
wherein:

the second insertion regulating member is a step
portion provided at an end of the tube;

5 the step portion has a surface substantially
perpendicular to an insertion direction of the tube; and

the surface of the step portion contacts the second
plate of the refrigerant container when the tube is connected
to the header tank.

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21. The cooling device according to claim 19,
wherein:

the second insertion regulating member is a step
portion provided in the second plate of the refrigerant
15 container around an insertion hole into which the tube is
inserted to communicate with the refrigerant container;

the step portion has a surface substantially
perpendicular to the insertion direction of the tube; and

20 a top end of the tube contacts the surface of the step
portion when the tube is inserted into the insertion hole.

22. The cooling device according to claim 1, wherein:

the second plate of the refrigerant container defines
a first hole into which the tube is inserted;

25 one of the third plate stacked on the second plate
defines a second hole having an open area smaller than an open
area of the first hole of the second plate; and

the tube is inserted into the first hole of the second tube to contact the one of the third plates around the second hole to communicate with the second hole of the one of the third plates.

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23. The cooling device according to claim 1, wherein:

the heat radiation core is disposed to perform heat exchange between the refrigerant flowing through the tubes and air passing through the heat radiation core outside the tubes;

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and

the heat radiation core is disposed to be divided into at least two core parts in a flow direction of air passing through the heat radiation core.